SECTION 15525

STEAM AND CONDENSATE PIPING

****

Edit to suit project requirements.

****

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe, pipe fittings, and valves.

1.2 LANL PERFORMED WORK

A. LANL's support services subcontractor will tie into the existing steam or condensate system. Refer to Part 3.

1.3 DEFINITIONS

A. Steam Distribution Piping: Steam piping upstream of the first steam shutoff valve, including valve, inside the building or steam pit.

B. Condensate Distribution Piping: Condensate piping upstream of the first steam shutoff valve inside the building or steam pit, including the steam trap piping upstream of the first steam shutoff valve.

C. Steam/Condensate Building Services Piping: Steam and condensate piping downstream of the first steam shutoff valve inside the building or steam pit.

1.4 SUBMITTALS

A. Submit the following in accordance with the requirements of Section 01300:

1. Catalog data on pipe and pipe fittings, valves, welding rod, cathodic protection systems, and condensate pipe coating.

2. Certification of welders.

1.5 QUALITY ASSURANCE

A. Welding

1. Welders: Certified in accordance with Section IX of ASME Boiler and Pressure Vessel Code.

2. Welding Materials and Procedures: Conform to Section IX of ASME Boiler and Pressure Vessel Code.

3. Weld Inspection: Conform to ASME B31.1-1995 for distribution piping and ASME B31.9-1996 for building services piping. Inspection shall be done by a certified welding inspector.

B. Dimensions

1. Dimensions of valves, fittings and flanges shall comply to ASME B16 series standards.

C. Installation

1. Distribution Piping: Comply with ASME B31.1-1995, Power Piping.

2. Building Services Piping: Comply with ASME B31.9-1996, Building Services Piping.

PART 2 PRODUCTS

****

Piping, fittings, and materials described herein are generally restricted to a maximum 150 psig working steam pressure (WSP). For other pressure and temperature ratings, additional specification and restrictions may be required.

Different products or materials are listed for each application. Select one or any combination for the application. Refer to Part 3 for valves and strainers installation instruction.

****

2.1 PRODUCT SUBSTITUTION

A. Refer to Section 01630.

2.2 STEAM DISTRIBUTION PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, A106, Schedule 40.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade B, Schedule 40.

D. Joints: Welded.

2.3 CONDENSATE DISTRIBUTION PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 80.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade B, Schedule 80.

D. Joints: Welded.

E. Coating: See Part 3, Corrosion Control.

2.4 STEAM DISTRIBUTION PIPING, ABOVE GRADE AND IN STEAM PITS (150 PSIG MAXIMUM)

A. Pipe: Black steel, A106, Schedule 40 (welded pipe).

B. Pipe: Black steel, A106, Schedule 80 (threaded pipe).

C. Fittings (threaded): Forged steel, ASTM A105, Class 2000.

D. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

E. Fittings (butt weld): Steel, ASTM A234, Grade B, Schedule 40 or 80 (to match piping).

F. Joints: Threaded for pipe sizes up to 3/4 in., welded or flanged for pipe sizes above 3/4 in.

2.5 CONDENSATE DISTRIBUTION PIPING, ABOVE GRADE AND IN STEAM PITS (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 80.

B. Fittings (threaded): Forged steel, ASTM A105, Class 2000.

C. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

D. Fittings (butt weld): Steel, ASTM A234, Grade B, Schedule 80.

E. Joints: Threaded for pipe sizes up to 3/4 in., welded or flanged for pipe sizes above 3/4 in.

2.6 STEAM BUILDING SERVICES PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 40.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade B, Schedule 40.

D. Joints: Welded.

2.7 CONDENSATE BUILDING SERVICES PIPING, BELOW GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 80.

B. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

C. Fittings (butt weld): Wrought carbon steel, ASTM A234, Grade B, Schedule 80.

D. Joints: Welded.

E. Coating: See Part 3, Corrosion Control.

2.8 STEAM BUILDING SERVICES PIPING, ABOVE GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 40 (welded pipe).

B. Pipe: Black steel, ASTM A53 or A106, Schedule 80 (threaded pipe).

C. Fittings (threaded): Malleable iron, ASME B16.3, Class 150 for pressures of 15 psig or less, Class 300 for pressures above 15 psig. NOTE: Eccentric threaded fittings are not available in malleable iron. Use steel butt welded eccentric fittings or threaded carbon steel, ASTM A234, reducing eccentric swage nipples, Grinnell Co.

D. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

E. Fittings (butt weld): Steel, ASTM A234, Grade B, Schedule 40 or 80 (to match piping).

F. Joints: Threaded for pipe sizes up to 2 in., welded or flanged for pipe sizes above 2 in.

2.9 CONDENSATE BUILDING SERVICES PIPING, ABOVE GRADE (150 PSIG MAXIMUM)

A. Pipe: Black steel, ASTM A53 or A106, Schedule 80.

B. Fittings (threaded): Malleable iron, ASME B16.3, Class 150 for pressures of 15 psig or less, Class 300 for pressures above 15 psig. NOTE: Eccentric threaded fittings are not

available in malleable iron. Use steel butt welded eccentric fittings or threaded carbon steel, ASTM A234, reducing eccentric swage nipples, Grinnell Co.

C. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.

D. Fittings (butt weld): Steel ASTM A234, Grade B, Schedule 80.

E. Joints: Threaded for pipe sizes up to 2 in., welded or flanged for pipe sizes above 2 in.

2.10 FLANGES, FOR PIPE SIZES OVER 2 In.

A. Forged steel, ASTM A105, Grade 1, ANSI Class 150, weld neck, raised face, dimensions per ANSI B16.5

2.11 GASKET MATERIAL

A. Pressures above 100 psig: Flexitallic, non-asbestos, CG style

B. Pressures 100 psig or less: Sheet gasket, branded material, 1/16 in. thick, non-asbestos, suitable for steam service up to 500EF. Klinger, No. C4401.

2.12 BOLTS, STUDS AND NUTS

A. Bolts/Studs: Alloy steel, ASTM A193, Grade B7.

B. Nuts: Alloy steel, ASTM A194, Grade 2H.

****

Refer to paragraph 3.2 J and K for valves and strainers selection criteria.

****

2.13 STEEL GATE VALVES (THREADED ENDS)

A. Manufacturer: Vogt, Series 12111.

B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 1595 psig, rising stem, threaded ends, hard faced seat and disc.

2.14 STEEL GATE VALVES (FLANGED OR WELDED ENDS)

A. Manufacturer: Powell, Figure 1503N.

B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.15 STEEL GLOBE VALVES (THREADED ENDS)

A. Manufacturer: Vogt, Series 12141.

B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 195 psig, rising stem, threaded ends, hard-faced seat and disc.

2.16 STEEL GLOBE VALVES (FLANGED OR WELDED ENDS)

A. Manufacturer: Powell, Figure 1531.

B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.17 BRONZE GATE VALVES (THREADED ENDS)

A. Manufacturer: Nibco, T-113.

B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, screw-in bonnet, rising stem, solid wedge, threaded ends.

2.18 BRONZE GLOBE VALVES (THREADED ENDS)

A. Manufacturer: Nibco, T211.

B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, screw-in bonnet, integral seat, renewable seat and disc, threaded ends.

2.19 BRONZE CHECK VALVES (THREADED ENDS)

A. Manufacturer: Nibco, T143.

B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, horizontal swing.

2.20 STEEL CHECK VALVES (THREADED ENDS)

A. Manufacturer: Vogt, No. 574.

B. Forged steel, ASTM A105, steam service, 350 degrees F at 125 psig, horizontal swing.

2.21 STRAINERS

A. Pressures 15 psig or less: “Y” Type, rated for 125 psig steam, service to 350 degrees F, 20 mesh stainless steel screens, bronze body, ASTM B61 with blowoff gate valve and plug.

B. Pressures above 15 psig: “Y” Type, rated for 250 psig steam, 20 mesh stainless steel screens, steel body, ASTM A216 with blowoff gate valve and plug.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction, protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and chemically treat systems. Refer to Section 15545.

3.2 INSTALLATION

A. Install in accordance with manufacturers’ instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Provide safe access or remote operators where valves and fittings are not exposed or installed over 7 feet in height above finished floor.

H. Slope steam and condensate piping one in. in 40 feet (0.25 percent) in direction of flow. Install eccentric reducers, flat on bottom, in horizontal runs of steam and condensate lines.

I. Install valves with stems upright or horizontal, not inverted.

J. Steam/Condensate Distribution Piping

1. Use steel valves and strainers in piping above grade and in steam pits, threaded ends for piping up to 3/4 in., welded or flanged ends for piping above 3/4 in.

2. Use welded or flanged end steel valves in piping below grade.

K. Steam/Condensate Building Services Piping

1. Use threaded bronze valves and strainers in piping up to 2 in., for design pressures 15 psig or less.

2. Use threaded steel valves and strainers in piping up to 2 in., for design pressures above 15 psig.

3. Use welded or flanged steel valves and strainers in piping above 2 in.

4. Use welded or flanged end steel valves in piping below grade.

L. Install eccentric reducers, flat on bottom, in horizontal runs of steam and condensate piping.

M. Use globe valves for throttling, bypass, or manual flow control services.

N. Use gate valves inside building to isolate equipment or part of the piping system, and for first steam valve inside building.

O. Install schedule 40 steel siphon tubes (pig tails) at pressure/temperature gauges.

P. Connect steam and condensate branch lines into top of main or at a 45 degree angle from top of main.

3.3 CLEARANCE

A. Horizontal separation between any underground utility service shall be minimum of 3 feet.

B. Vertical separation between any underground utility service shall be a minimum of 2 feet.

3.4 TIE-IN

A. Tie-in to existing steam and condensate systems shall be coordinated with and performed by LANL's Support Services Subcontractor (SSS). The Contractor shall provide materials required for tie-in and trench as noted on the Drawings. The tie-in will be inspected by the Construction Inspector and the F-4 Utilities representative.

3.5 PIPING IDENTIFICATION

A. Refer to Section 15190, Mechanical Identification.

3.6 TESTING

A. Refer to Section 15992, Testing of Piping System, for pressure testing & holiday testing.

3.7 PIPING SUPPORTS

A. Refer to Section 15060.

3.8 INSULATION

A. Refer to Section 15250, Piping Insulation.

3.9 CORROSION CONTROL

****

Contact Robert Keown, JCI Utilities at 667-6191, or Jerry Gonzales, F-4 at 5-2612 for cathodic protection requirements. NOTE: Factory pre-insulated piping systems (e.g., Rovanco Corp, 505-344-7100) may be used as a replacement for corrosion control and field insulation. NOTE: Pipe coating is not required for steam piping. The following is an example of a condensate piping coating specification. Verify part numbers with manufacturer.

****

A. Condensate Pipe Coating: Field wrap or factory coat buried condensate piping. Coating shall be a minimum of 30 mils thick and suitable for a continuous operating temperature of 200EF. Field wrap joints and fittings.

1. Piping Field Wrap: Apply a hand brush application of primer, Polyken 2019 or 2027, and single layers (half lapped) of inner wrap, Polyken 2000 tape, and outer wrap, Polyken 2055 tape.

2. Piping Factory Coating: Fusion bonded, epoxy pipe coating, Nap-Gard, Mark X, product no. 7-2502. Bredero Price Co., (970) 484-1440.

3. Joints and Fittings: Apply a hand brush application of primer, Polyken 2019 or 2027, and a double layer (half-lapped) of tape, Polyken 2036.

4. Apply field coatings in accordance with the manufacturer's instructions.

END OF SECTION